## AMENDMENTS TO THE SPECIFICATION

**Please replace the paragraph no.** [0066] **of the published application with the following amended paragraph:**

Supporting member 4a provided with a rectangular hole therein is arranged around the periphery of base 21a. Beam members 22a connect supporting member 4a and base 21a. Beam members 22a extend from each side of base 21a to the opposing side of supporting member 4a, with both ends fixed to base 21a and supporting member 4a, respectively at the joints. Beam member 22a may be fabricated of a material similar to that of base 21a.

**Please replace the paragraph no.** [0069] **of the published application with the following amended paragraph:**

First, as an AC electric field is applied to upper electrode layer 31a and lower electrode layer 32a of piezo-electric element 1a, piezo-electric element 1a performs an expanding and contracting motion. Specifically, piezo-electric element 1a alternately repeats, in accordance with the orientation of the electric field, a deformation mode in which piezo-electric body 3a is compressed (a deformation mode in which the surfaces, to which upper electrode layer 31a and lower electrode layer 32a are fixed, are expanded, while the height of piezo-electric body 3a (the spacing between upper electrode layer 31a and lower electrode layer 32a) is reduced) and a deformation mode in which piezo-electric body 3a elongates in the height direction (a deformation mode in which the surfaces, to which upper electrode layer 31a and lower electrode layer 32a are fixed, are contracted, while the height of piezo-electric body 3a is increased). As a result, when the fixing surfaces expand, the surface of base 21a deforms to bend in a direction opposite to piezo-electric body 3a by the constraint between base 21a and piezo-electric body 3a.

Conversely, when the fixing surfaces contract, the surface of base 21a deforms to bend towards piezo-electric body 3a. With these motions, the peripheral edge of base 21a vibrates up and down, which motions are transmitted to a plurality of beam members 22a attached to base 21a. Since beam members 22a are fixed to supporting member 4a, beam members 22a and piezo-electric element 1a, supported by beam members 22a, vibrate in the up-and-down direction at a large amplitude about fixed supporting member 4a.

**Please replace the paragraph no.** [0075] **of the published application with the following amended paragraph:**

Fourthly, since beam members 22a are completely bonded and fixed to supporting member 4a, the joints serve as vibration nodes when the piezo-electric actuator vibrates. Consequently, the vibration is less apt to propagate from the piezo-electric actuator toward an electronic device through the joints, resulting in higher reliability with less possibility of fatigue fracture and generation of abnormal sound due to vibration of the joints.

**Please replace the paragraph no.** [0081] **of the published application with the following amended paragraph:**

FIG. 8 illustrates a conceptual cross-sectional view of a piezo-electric actuator according to a fourth embodiment of the present invention. This embodiment is made by providing the second embodiment with insulating layers on both sides of piezo-electric bodies and in the central portion of the actuator. Specifically, upper piezo-electric body 3e is sandwiched between upper electrode layer 31e and lower electrode layer 32e, and lower piezo-electric body 3e' is sandwiched between upper electrode layer 31e' and lower electrode layer 32e'. Next, upper

insulating layer 33e is disposed on upper electrode layer 31e, and lower insulating layer 33e' is disposed under lower electrode layer 32e'. Further, intermediate insulating layer 35[[e]] is disposed between lower electrode layer 32e and upper electrode layer 31e'. Such a layer configuration prevents electric leakage to the base even if a metal base is used for bonding, and allows for safe handling.

**Please replace the paragraph no. [0100] of the published application with the following amended paragraph:**

The piezo-electric actuator of Example 2 has base 121b, supporting member 104b, and beam members 122b. In Example 2, the number of beam members 122b attached to the base was changed from four in Example 1 to two in order to confirm the degree of reduction in the resonance frequency. As illustrated in FIG. 14, conditions were the same as in Example 1 except for the number of beam members 122b. The piezo-electric actuator had a circular form having a diameter of 16 mm and a thickness of 0.45 mm. Values in the figure are in units of millimeters. The piezo-electric actuator provided a reciprocal vibration mode, with a resonance frequency of 498 HZ, a maximum amplitude of the vibration velocity of 172 mm/s, and a maximum vibration velocity ratio of 0.86.

**Please replace the paragraph no. [0104] of the published application with the following amended paragraph:**

In Example 4, a bimorph type piezo-electric actuator was fabricated using two piezo-electric elements which differed in vibrating direction. As illustrated in FIG. 15, the piezo-electric actuator of Example 4 has a base 121c and piezo-electric element 101c which has piezo-

electric bodies 103c, 103c' which are in the same shape and are bonded such that they vibrate in different directions. Piezo-electric bodies 103c, 103c' are in the form of a 10 mm square having a thickness of 0.2 mm. Therefore, piezo-electric element 101c is the same as Example 2 in shape. Also, the configuration except for the piezo-electric element is the same as Example 2.

**Please replace the paragraph no.** [0107] **of the published application with the following amended paragraph:**

In Example 5, the piezo-electric element was changed from the single type in Example 2 to laminated layers. The laminate type piezo-electric element 101d of this example is a three-layer type. As illustrated in FIG. 16, it consists of upper insulating layer 133d, four electrode layers 131d, three piezo-electric bodies 103d, and lower insulating layer 133d' which are laminated. Upper insulating layer 133d and lower insulating layer 133d' are in the form of a 10 mm square with a thickness of 80 .mu.m. Piezo-electric bodies 103d are in the form of a 10 mm square with a thickness of 80 .mu.m. Electrode layers 131d are in the form of a 10 mm square with a thickness of 3 .mu.m. Therefore, piezo-electric element 101d is in the form of a 10 mm square having a thickness of approximately 0.4 mm. Further, the piezo-electric actuator has a circular shape with a diameter of 16 mm and a thickness of 0.45 mm, which is the same as Example 2.

**Please replace the paragraph no.** [0111] **of the published application with the following amended paragraph:**

In this example, insulating layer 135e was disposed between two piezo-electric plates of the bimorph piezo-electric element of Example 4, as illustrated in FIG. 17. A polyethylene

terephthalate (PET) film with a thickness of 0.1 mm was used for insulating layer 135e disposed between the two piezo-electric plates 103e and 103e' of the bimorph piezo-electric element 101e. The piezo-electric element as illustrated in FIG. 17 also has base 121e. The configuration of Example 6 is the same as that of Example 4, except that insulating layer 135e was added. The thickness of the piezo-electric actuator of this example is 0.55 mm which represents an increase of 0.1 mm as compared with Example 2, due to the thickness of insulating layer 135e.

**Please replace the paragraph no.** [0114] **of the published application with the following amended paragraph:**

As illustrated in FIG. 18, in this example, vibrating film 134f was bonded to the piezo-electric actuator of Example 2 to create acoustic element 39, which then was operated to radiate sound by the vibration that was transmitted to vibrating film 134f. Specifically, vibrating film 134f made of a polyethylene terephthalate (PET) film with a thickness of 0.05 mm was attached to the back side of base 121f. The piezo-electric actuator illustrated in FIG. 18 comprises the piezo-electric element 101f.

**Please replace the paragraph no.** [0116] **of the published application with the following amended paragraph:**

In order to compare the effects of the piezo-electric actuator of Example 7, a conventional piezo-electric acoustic element was fabricated, as illustrated in FIG. 19. This acoustic element has a piezo-electric element 1101a', a metal plate 1105', and vibrating film 134f' that is similar to that of Example 7, and was attached to the piezo-electric actuator (see

FIG. 13) of Comparative Example 1. The fabricated acoustic element presented a resonance frequency of 796 HZ, a Q-value of 37, and a sound pressure level of 79 dB.

**Please replace the paragraph no.** [0124] **of the published application with the following amended paragraph:**

As illustrated in FIG. 22, electromagnetic acoustic element 61 was mounted in a cellular phone. The acoustic element of this comparative example has permanent magnet 62, voice coil 63, and diaphragm 64. A magnetic force was generated by voice coil 63 when a current was applied from electric terminal 65[[a]]. Diaphragm 64 was repeatedly attracted and repulsed by the generated magnetic force to generate a sound. Diaphragm 64 is connected to housing 67 by coupling member <u>66</u> ~~67~~ at the periphery. The acoustic element of Comparative Example 4 has a circular shape having a diameter of 20 mm and a thickness of 2.5 mm. Sound pressure level and frequency characteristic of sound pressure of the acoustic element were measured at a distance of 30 mm in a manner similar to that of Example 9. The resultant resonance frequency was 730 HZ, and the sound level was 73 dB.

**Please delete the present Abstract of the Disclosure.**

**Please add the following new Abstract of the Disclosure:**

A piezo-electric actuator is provided which is capable of providing large vibration amplitude, is adjustable for resonance frequency, and has high reliability while avoiding an increase in outer dimensions.

~~A piezo-electric actuator comprising: piezo-electric element la having piezo-electric body 3a which is provided with at least two opposing surfaces, wherein the surfaces perform an expanding and contracting motion in accordance with the state of an electric field; a constraint member 21a for constraining piezo-electric element 1a on at least one of the two surfaces, a supporting member disposed around constraint member 21a, and a plurality of beam members 22a each having both ends fixed to constraint member 21a and supporting member 4a, respectively, wherein each beam member has a neutral axis for bending in a direction substantially parallel with the constrained surface, wherein the constraint member vibrates by vibration which is generated by the constraining effect between the constraint member and the piezo-electric element, and is amplified by the beam members.~~